Signal-to-Noise

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1 Overview

This module, *S-to-N*, calculates the Signal-to-noise ratio for each spectrum. The noise in the system and the atmostphere is taken into account with respect ot the galaxy's spectrum. The telescope throughput efficiency modifies the simulated galaxy spectrum. Another spectral noise source is inserted. The ratio of Signal to noise is computed via these elements, including smoothing for arbitrary spectral grid spacing.

1.1 Languages

IDL is the only language used. There is a very important internal function that requires IDL and would probably take too much time to re-write. The rest of the code could be converted easily.

1.2 In context

In the Signa-to-noise calculation, each galaxy spectrum and the system throughput efficiency will be combined. The outputs are S/N spectra, which can be used in the redshift estimator.

1.3 Timing

???

1.4 Open Issues for Initial development

- **Important question:** How do we wrap an IDL function, specifically the k-correct function?

2 Inputs/Outputs

The inputs are:

- wavelength resolution
- readnoise
- airmass of each galaxy
- exposure time
- others?

The outputs are:

- Observed signal-to-noise as a function of wavelength for each galaxy.

3 Function Layout

3.1 User-defined Functions

- desbcc.pro
- resnew.pro??? (what is this)
- plot_ston.py (not made yet)

3.2 Functions Required

- Kcorrect by Mike Blanton
- k_reconstruct_spec ???

which functions and subfunctions are there (created by user)

4 Code Procedure

4.1 Signal-to-noise

1. read galaxy photometry and spectra ?
2. run kcorrect to get some spectral coeffcients
3. reconstruct SEDs (i.e., spectra) from coefficients.
4. read sky backgruond file
5. convert sky photons to photons/Angstrom
6. read transmission file
7. read atm absorp file
8. smooth spectra to resolution of survey
9. convert sed to photon counts
10. redshift sed's
11. interpolate to match spectral resolutions
12. integrate over pixels to bin spectra to survey resolution
13. multiply flux by telescope transmission (throughput)
14. calculate s/n
15. generate observed spectra
16. save spectra

5 Execution